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09/652,097	08/31/2000	Mark Richard Shaw	13DV13495	2850

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/652,097	SHAW ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 August 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are pending. Section I covers response from applicants with section II covering rejections.

Section I (Response to Amended Claims)

Response to Corrected Drawings

2. Applicants are thanked for annotating figures 1 and 2 as prior art. Objection is withdrawn (pg. 5, lines 4-8).

Response to Information Discloser Statement

3. Applicants are thanked for their response to the reference art (pg. 5, lines 9-20). The examiner will disregard references by Heller et al. (U.S. Patent 5,667,820 & 5,885,511) and PCT-International search report (June 14, 2002), thus the objection is withdrawn.

Response to 35 U.S.C 101

4. The examiner acknowledges applicants response to 101 rejection (pg. 5, lines 21-5); however the rejection for claims 1 and 2 stands due to the lack of post solution activity as stated in the first office action.

Response to 35 U.S.C 112 first paragraph

5. The applicants are thanked for responding, in kind, to 112 first paragraph rejections. All rejections stated on from page 6 to page 8, lines 1-4 are withdrawn.

Response to 35 U.S.C 112 second paragraph

6. The applicants are thanked for responding, in kind, to 112-second paragraph rejections (pg. 8, lines 7-21). The examiner withdraws rejection for claims 1,15, and 18. The examiner still finds the explanation of dynamic system operating inputs as broad with no numeric examples; rejection stands for claims 2,16 and 17. Claim 4 rejection stands because there's no detailed explanation as to how these values are chosen or eliminated. Claim 6 rejection stands because the explanation is still unclear. Furthermore, the rejection of claim 7 is withdrawn.

Response to 35 U.S.C. 102(b) Rejections

7. Applicants are thanked for responding, in kind, to 35 U.S.C. 102(b) rejections for claims 1 and 2 (pg. 8, lines 25-29 and pg. 9, lines 1-6). The 102(b) rejection is withdrawn.

Response to 35 U.S.C. 103 Rejection

8. The examiner acknowledges applicants traversing of 103 arguments; however, the examiner has found new art due to new amendment. Note: **The examiner interprets regression technique is related or integral to the flexibility or bending to tube bellows elements.**

Section II (Rejections)

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

10. Claims 4 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

- **Claims 2, 16 and 17:** What are the dynamic system operating inputs?
- **Claim 4:** "... Inputting geometry inputs including..." What are the standards or required geometry inputs?
- **Claim 6:** The examiner fails to understand the purpose of this claim. If claim 5, for example, is to find the stiffness multiplier, isn't it inherent that one has found the stiffness of the system?

Claim Rejections - 35 USC § 101

11. The following is a quotation from 35 U.S.C. 101, which reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1-2 are rejected under 35 U.S.C. 101 because the claimed invention is directed to a mathematical algorithm. The examiner respectfully submits that the applicants have not claimed a practical application. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "useful, concrete and tangible result." The test for

practical application as applied by the examiner involves the determination of the following factors:

> (1) "Useful" - The Supreme Court in *Diamond v. Diehr* requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:
>
> > (a) the utility need not be expressly recited in the claims, rather it may be inferred.
> > (b) if the utility is not asserted in the written description, then it must be well established.
>
> (2) "Tangible" - Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium, which enabled its functionality to be realized.
>
> (3) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite a tangible or concrete result. The claims are not tangible because they appear to recite a mathematical algorithm (because no patentable weight has been provided to the preamble);--namely using known equations in the realm of stress analysis of a materials and thus is confining or limiting space that doesn't have specific preprocessing or post solution activity.

Claim Rejections - 35 USC § 103

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 1-19 are rejected under 35 U.S.C. 103 (a) as unpatentable by Rosemount™ Inc. (Technical Data Sheet "Pressure Fundamentals and Transmitter Selection" 1998), in view of Broman et al. ("Modeling Flexible Bellows by Standard Beam Finite Elements" 1999).

Rosemount™ Inc. teaches the fundamentals of pressure measurement as they relate to industry, and factors that should be considered in selecting a pressure transmitter inside mechanical elements (pg. 2, introduction; and pg. 5, bellow elements). Although, Rosemount teaches the applicable physics behind theses devices in relation to pressure flow, it doesn't teach applying these properties to modeling/simulation.

Broman et al. teaches modeling flexible bellows by standard beam finite elements by way of the *I-DEAS Master Series 6* modeling software (pg. 9, 4th paragraph, line 3).

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use Broman et al. to modify Rosemount™ Inc. since it would have been advantageous to model real-time events to confront and eliminate safety hazards due to the possibility of underestimating pressure states and natural frequencies values.

Claim 1: A method for predicting natural frequency (Rosemount: pg. 5, left column, 2nd paragraph & equation) responses said method comprising the steps of: providing at least one tube sub-system including a plurality of shrouded bellows components; determining a stiffness multiplier within each of the shrouded bellows components from input values; and using the determined stiffness multiplier in a model (Broman: title and pg. 18, lines 10-11) to predict a natural frequency response.

Claim 2: A method in accordance with Claim 1 further comprising the step of inputting dynamic system operating inputs into the model (Broman: pgs 4-5, notations; and Rosemount: pg. 4, right column, 1st paragraph and 2nd paragraph, lines 9-12).

Claim 3: A method in accordance with Claim 2 wherein said step of inputting dynamic system (Broman: pgs 4-5, notations; and Rosemount: pg. 4, right column, 1st paragraph and 2nd paragraph, lines 9-12) operating inputs further comprises the step of inputting at least an operating pressure and vibratory environment into the model (Broman: pg. 24, paragraphs 2 and 3).

Claim 4: A method in accordance with Claim 2(Broman: pgs 4-5, notations; and Rosemount: pg. 4, right column, 1st paragraph and 2nd paragraph, lines 9-12) further comprising the step of inputting geometry (Broman: pgs 17, last two sentences; and pg. 18, figure 3.6) inputs including at least one of a bellows pitch and a mating tube diameter into the model.

Claims 5: A method in accordance with Claim 3(Broman: pgs 4-5, notations; and Rosemount: pg. 4, right column, 1st paragraph and 2nd paragraph, lines 9-12) wherein said step of determining a stiffness multiplier further comprises the step of using a regression technique to determine the stiffness multiplier (Rosemount: pg. 5, natural frequency equation; and Broman: pg 13, section 3.3 Axial Vibrations).

Claim 6: A method in accordance with Claim 3 (Broman: pgs 4-5, notations; and Rosemount: pg. 4, right column, 1st paragraph and 2nd paragraph, lines 9-12)further comprising the step of determining system stiffness as a function of the stiffness multiplier (Rosemount: pg. 5, natural frequency equation; and Broman: pg 13, section 3.3 Axial Vibrations).

Claim 7: A modeling system for determining natural frequency response of shrouded bellows components, said system comprising a processor configured to determine a stiffness multiplier from input values(Rosemount: pg. 5, natural frequency equation, pg.

24, section 4.6 Summary of Modeling Procedure; and Broman: pg 13, section 3.3 Axial Vibrations).

Claim 8: A modeling system in accordance with Claim 7 wherein the stiffness multiplier is used to determine the natural frequency response (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations).

Claim 9: A modeling system in accordance with Claim 8(Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) wherein the input values include at least one of shrouded bellows geometry inputs and dynamic operating condition inputs (Broman: pg. 31-35, section 4.7.2, Specimen from Ting-Xin et al.).

Claim 10: A modeling system in accordance with Claim 8(Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) wherein the bellows geometry inputs include at least one of a tube (Bronman: pg. 18, 2nd paragraph and figure 3.6) sub-system diameter and a bellows pitch.

Claim 11: A modeling system in accordance with Claim 8(Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd

paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) wherein the dynamic operating condition inputs include at least an operating pressure (Broman: pg.26, section 4.7.1, Geometry and material properties (*E*)).

Claim 12: A modeling system in accordance with Claim 8 (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) wherein the stiffness multiplier is adjustable such that a dynamic stiffness of the shrouded bellows is selectively variable.

Claim 13: A modeling system in accordance with Claim 8(Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) wherein the stiffness multiplier determined using a regression technique.

Claim 14: A system for determining natural frequency response of shrouded bellows components, said system comprising a model configured to predict the natural frequency response as a function of a stiffness multiplier (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations).

Claim 15: A system in accordance with Claim 14 wherein said model further configured to determine the stiffness multiplier from input values (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) (Broman: pg. 31-35, section 4.7.2, Specimen from Ting-Xin et al.).

Claim 16: A system in accordance with Claim 15 (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) (Broman: pg. 31-35, section 4.7.2, Specimen from Ting-Xin et al.) wherein the input values include at least one of shrouded bellows geometry inputs and dynamic operating condition inputs, the shrouded bellows geometry inputs including at least one of a tube sub-system diameter and a bellows pitch, the dynamic operating condition inputs including at least an operating pressure.

Claim 17: A system in accordance with Claim 14 wherein the stiffness multiplier is adjustable such that a dynamic stiffness of the shrouded bellows is selectively variable.

Claim 18: A system in accordance with Claim 14 (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations)wherein the stiffness multiplier determined using a regression technique (Broman: pg. 25, line 11).

Claim 19: A system in accordance with Claim 18 wherein the regression technique comprises a regression equation (Rosemount: pg. 5, natural frequency equation, pg. 24, section 4.6 Summary of Modeling Procedure, pg. 31 2nd paragraph; and Broman: pg 13, section 3.3 Axial Vibrations) (Broman: pg. 31-35, section 4.7.2, Specimen from Ting-Xin et al.).

Correspondence Information

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Stevens whose telephone number is (703) 305-0365, Monday-Friday (8:30 am- 5:30 pm) or contact Supervisor Mr. Kevin Teska at (703) 305-9704. The fax number for the group is 703-872-9306.

Any inquires of general nature or relating to the status of this application should be directed to the Group receptionist whose phone number is (703) 305-3900.

May 14, 2004

THS

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER